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DEPARTMENT OF **EARTH AND ENVIRONMENTAL SCIENCES**
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FWO VLAANDEREN

The impact of the African Great Lakes on the regional climate

in a dynamically downscaled CORDEX simulation (COSMO-CLM)

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My website:

1. Motivation

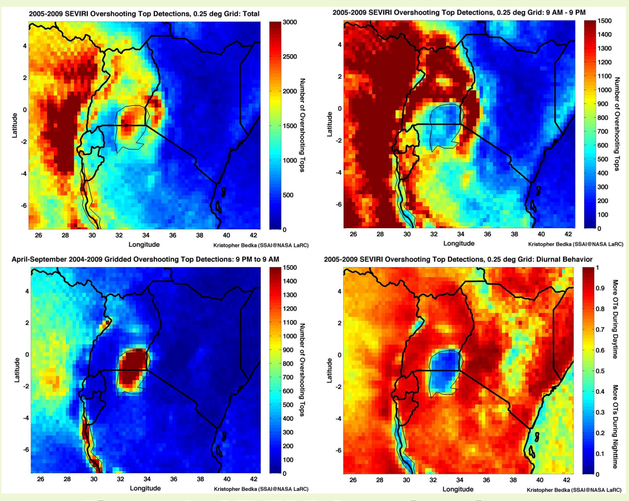

Figure 1. SEVIRI Overshooting top detections (Bedka, pers. comm.).

- severe night-time thunder-storms pose a serious tread to local fishing communities
- 5000 casualties per year estimated by local policy makers

Figure 2. Traditional fishing in Lake Kivu.

2. Setup

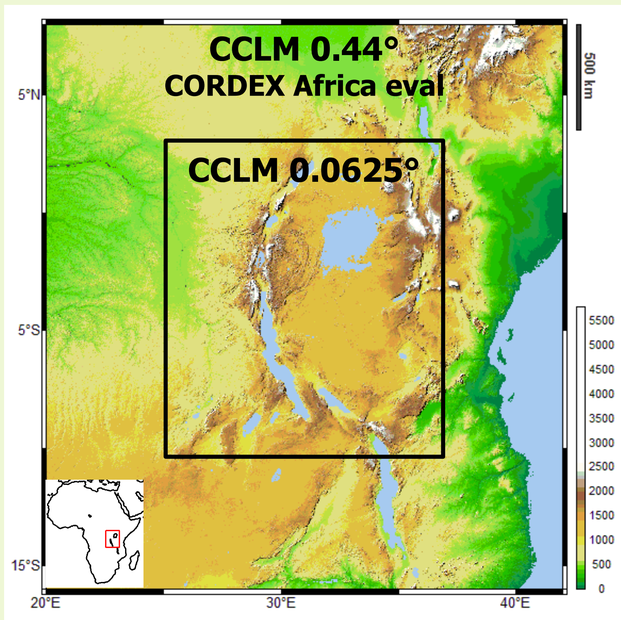

Figure 3. Nesting strategy.

- 2002
- 15 configurations tested:
  - CCLM SST ➔ CORDEX!
  - CCLM FLake
  - CCLM² FLake
- nolakes: each lake pixel replaced by a random land pixel within 50 km radius

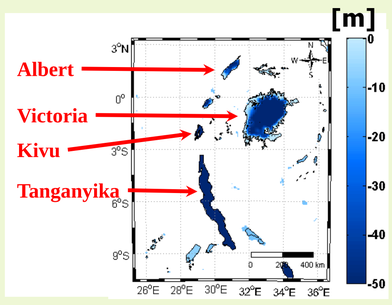

Figure 4. FLake bathymetry.

3. Model performance

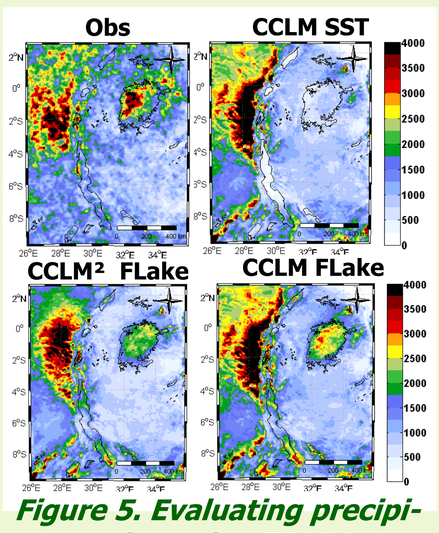

Figure 5. Evaluating precipitation using TRMM.

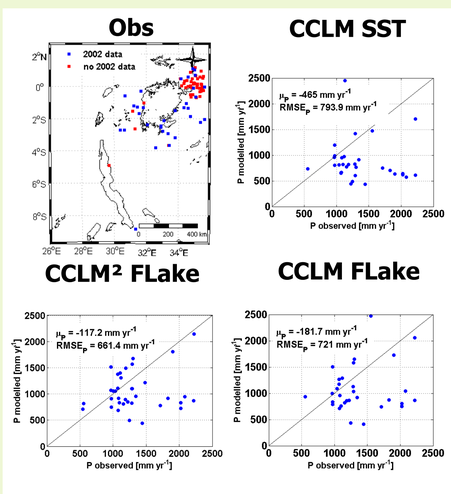

Figure 6. Evaluating precipitation using pluviometers.

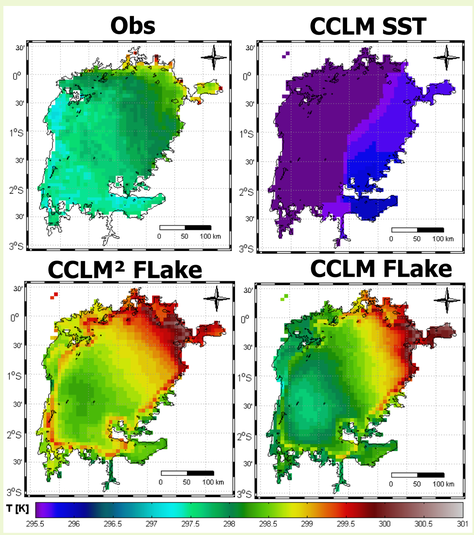

Figure 7. Evaluating lake surface temperatures using satellite data.

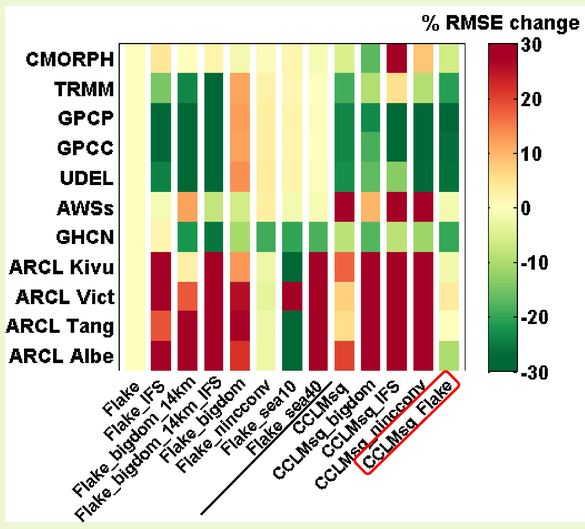

Figure 8. Systematic model evaluation.

- in contrast to CCLM FLake and CCLM² FLake, CCLM SST does not capture the enhanced precipitation over the AGLs
- using FLake cuts the bias in half relative to the default configuration!
- while CCLM SST depicts a cold bias, CCLM Flake and CCLM² FLake closely reproduce the observations
- CCLM² Flake clearly has the highest overall skill

4. Impact

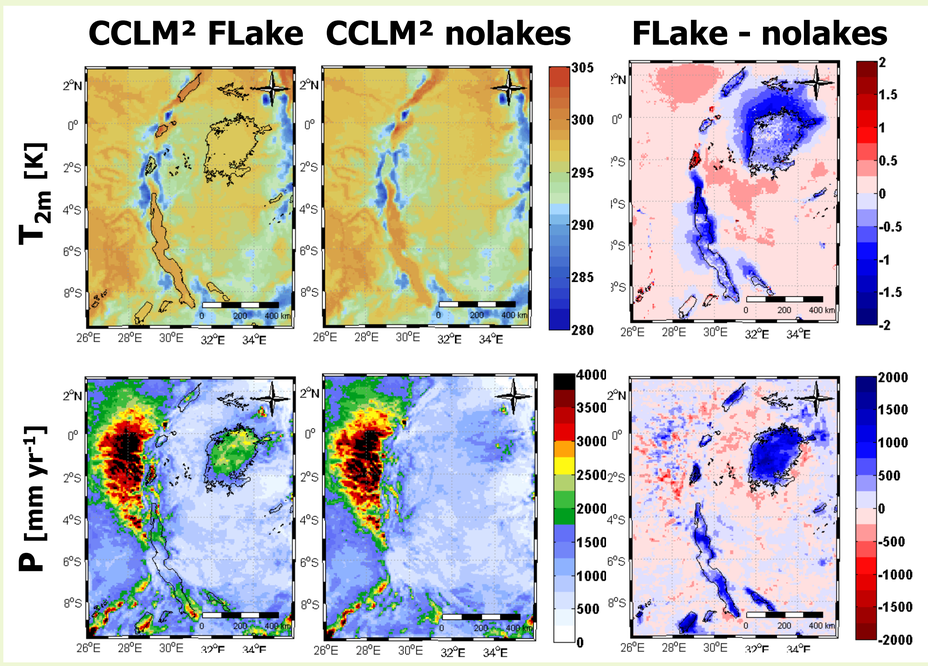

Figure 9. Impact of the AGLs on the regional climate.

- the AGLs cool the surface and generate enhanced precipitation, in both cases with pronounced spatial patterns.
- interesting exception is Lake Kivu, which calls for further investigations
- thermal inertia of the AGLs generates enhanced night-time moisture input into the boundary layer, near-surface convergence cause the lifting of these air masses

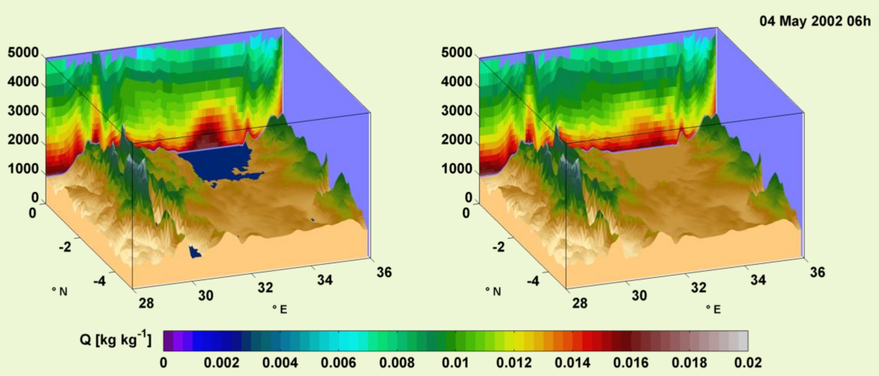

Figure 10. Total moisture content in the lower troposphere

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